

LUBRICATING SYSTEM

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LUBRICATING SYSTEM

Oil is circulated under pressure by a rotor type pump. The pump is mounted on the cylinder block inside the oil pan and driven by the chain via the crankshaft. A full flow type oil filter is mounted on the right front of the cylinder block.

The oil capacity is 3.9 liters (8.2 U.S. paints, 6.7 Imp. paints).

2-A. LUBRICATING CIRCUIT

1. The oil pump which is driven by the chain, draws up oil from the oil pan through the strainer and sends it to the oil filter.

2. Oil that has been filtered through the oil filter is forced to the main oil gallery and then to the main bearings.

3. The passages in the crankshaft direct the oil from the main bearings to the connecting rod bearings.

4. The cylinder walls, piston pins and bushes are lubricated with oil squirted out of the oil holes on the large end of the connecting rods.

5. The crankshaft and camshaft sprockets are lubricated by oil which is supplied through a passage from the main oil gallery to the oil jet.

6. Oil from the main gallery reaching the oil control plug on the front right side of the cylinder head is forced up to the front camshaft bearing and the exhaust side rocker arm shaft.

7. Oil from the oil passage turning point of the front camshaft bearing is forced to the intake side rocker arm shaft, lubricates each of the rocker arm bushes and then passes on the center camshaft bearing. Also, the oil lubricates the valve stem and other valve train surfaces.

8. Oil from the front camshaft bearing is forced to the oil pipe and ejected from the jets on the oil pipe to lubricate the cam surfaces, and then oil passing through the oil pipe is forced to the rear camshaft bearing.

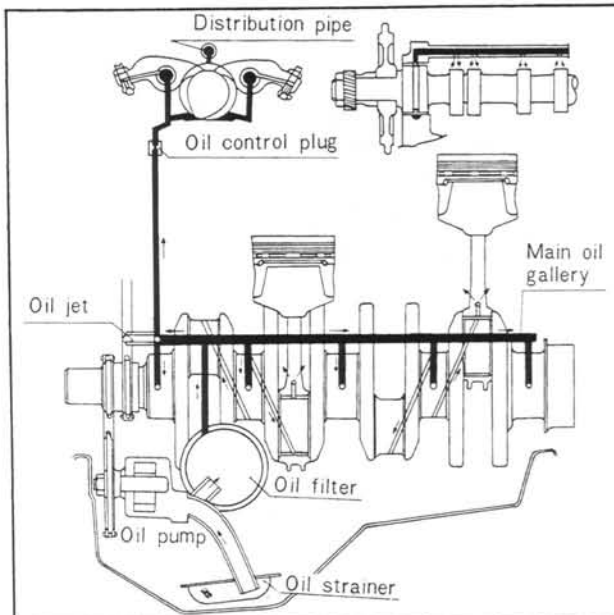


Fig. 2-1 Lubricating circuit

9. The distributor drive shaft is lubricated with oil splashed on the lubricating-hole for the drive shaft by operation of the timing chain and the rocker arms.

2-B. OIL PRESSURE RELIEF VALVE

The oil pressure relief valve is provided into the oil pump body.

When the engine revolution becomes high and excessive oil pressure develops in the system, the relief valve opens to relieve the pressure and to return the excess oil to the oil pan. Thus, the oil pressure maintains within the maximum pressure of 4.5 kg/cm^2 (64 lb/in^2).

2-C. OIL PRESSURE SWITCH

The oil pressure switch fitted to the filter body is connected to the oil pressure warning lamp with the wiring.

Safe minimum pressure is 0.3 kg/cm^2 (4.3 lb/in^2) at idle. If the oil pressure drops below 0.3 kg/cm^2 (4.3 lb/in^2), the warning lamp lights up to indicate some troubles in the lubricating system.

Therefore, when the warning lamp goes on, immediate check should be made

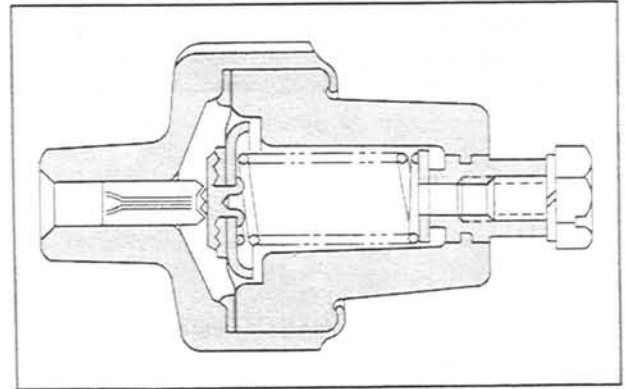


Fig. 2-2 Oil pressure switch

2-D. CHECKING OF OIL PRESSURE

1. Remove the oil pressure switch and connect the oil pressure gauge (49 0187 280) instead.



Fig. 2-3 Checking of oil pressure.

2. Warm up the engine to the normal operating temperature.

3. Run the engine at 3,000 rpm and take a reading the gauge.

If the reading of the gauge is 3.5 to 4.5 kg/cm² (50 to 64 lb/in²), the oil pressure is normal.

Should there be a noticeable drop in pressure, check the following points.

- 1) Ensure that the oil level is between the "F" and "L" of the dipstick gauge.
- 2) Check the oil filter for clog. If it exists, replace the filter cartridge, referring to Par. 2-F-1.
- 3) Check the oil pump, as described in Par. 2-E-1.
- 4) Check the relief valve for worn plunger and fatigued spring. The free length of the spring is 46.4 mm (1.83 in).

2-E. OIL PUMP

The oil pump is of a rotor type based on the trochoid curve and consists of the parts as shown in Fig. 2-6. The feeding capacity is 13.0 liters/min. (3.4 U.S. gallons/min., 2.9 Imp. gallons/min.) at 2,000 rpm of engine revolution.

2-E-1. Checking of Oil Pump

1. Check the clearance between the lobes of the rotors with a feeler gauge as shown in Fig. 2-4. If the clearance is more than 0.25 mm (0.010 in), replace both rotors.

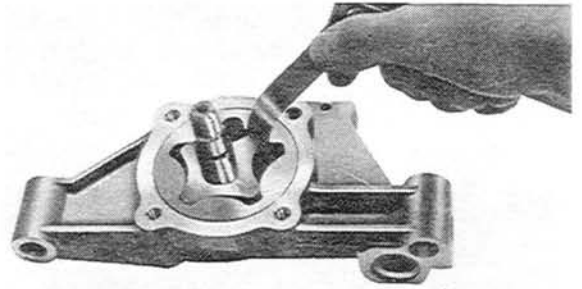


Fig. 2-4 Checking of clearance between rotors

2. Check the clearance between the outer rotor and pump body with a feeler gauge. This clearance should be 0.14 to 0.25 mm (0.006 to 0.010 in).

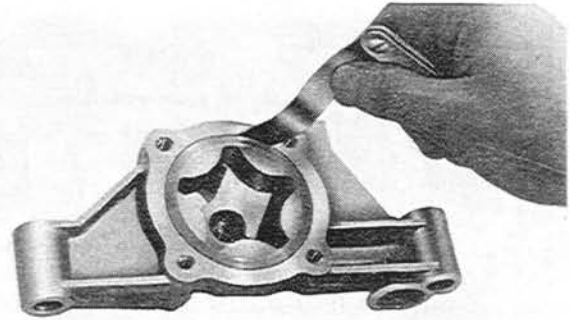


Fig. 2-5 Checking of rotor and body clearance

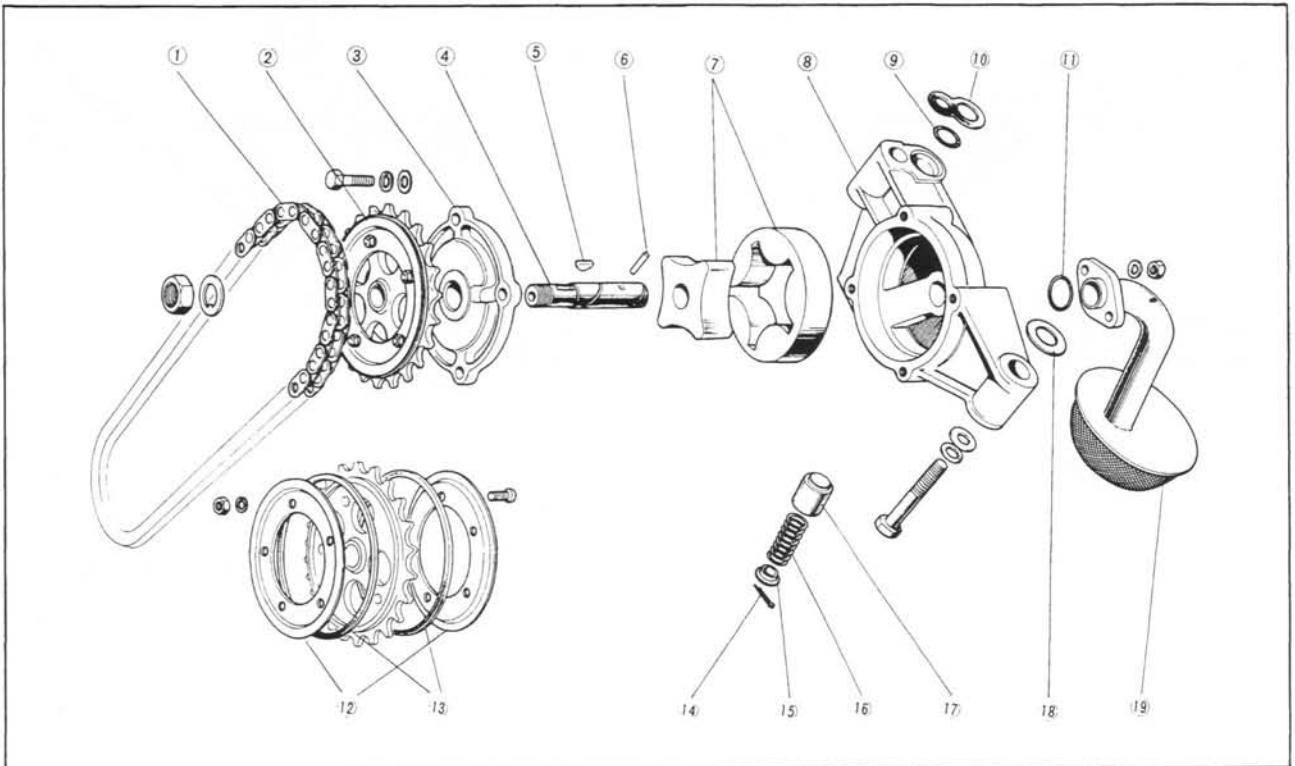


Fig. 2-6 Oil pump

- | | | | |
|----------------------|--------------------|------------------|--------------------|
| 1. Drive chain | 6. Grooved pin | 11. "O" ring | 16. Spring |
| 2. Sprocket assembly | 7. Rotor assembly | 12. Rubber guide | 17. Plunger |
| 3. Cover | 8. Body | 13. Rubber ring | 18. Adjusting shim |
| 4. Shaft | 9. "O" ring | 14. Split pin | 19. Oil strainer |
| 5. Woodruff key | 10. Adjusting shim | 15. Spring seat | |

3. Check the end of the rotors. Place a straight edge across the pump body and measure the clearance between the rotor and the straight edge with a feeler gauge as shown in Fig. 2-7.

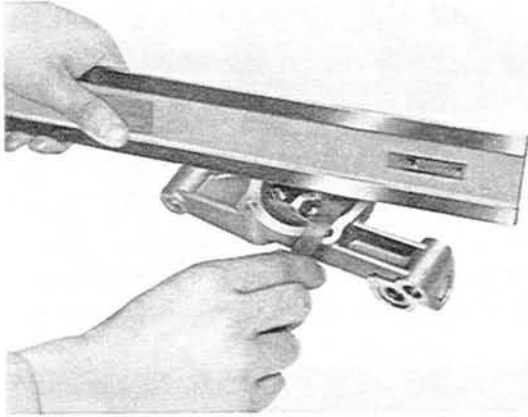


Fig. 2-7 Checking of rotor end float

Then, place a straight edge across the pump cover and measure the clearance between the straight edge and the cover.

If the end float is **0.15 mm (0.006 in)** or more, correct the pump cover by grinding. The standard end float is 0.04 to 0.10 mm (0.002 to 0.004 in).

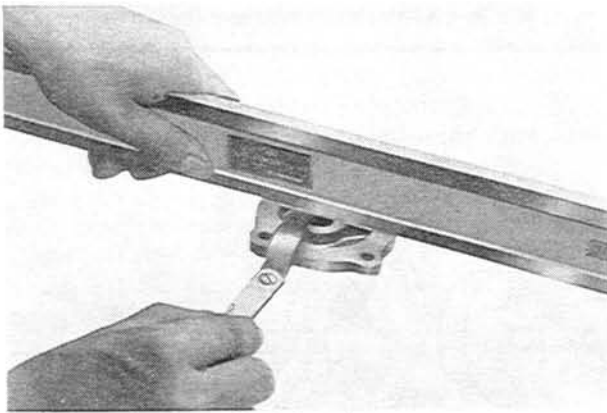


Fig. 2-8 Checking of pump cover

2-F. OIL FILTER

The oil filter is of a cartridge type. The element of the filter is sealed in the container as a unit. The oil filter is provided with a relief valve.

If the oil filter clogs due to impurities in oil and the filtering resistance reaches 0.8 to 1.2 kg/cm² (11 to 18 lb/in²), the oil can not pass through the element.

However, the oil pushes the relief valve open and unfiltered oil is supplied to the engine. The element should be replaced every **12,000 km (8,000 miles)**.

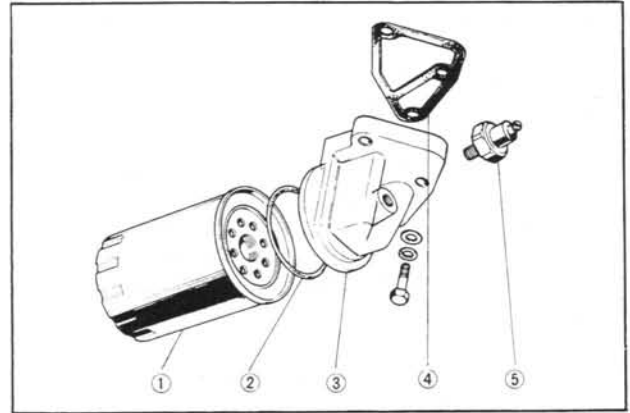


Fig. 2-9 Oil filter

- | | |
|--------------|------------------------|
| 1. Cartridge | 4. Gasket |
| 2. Oil seal | 5. Oil pressure switch |
| 3. Cover | |

2-F-1. Replacing of Oil Filter

1. Remove the oil filter cartridge with a wrench as shown in Fig. 2-10.

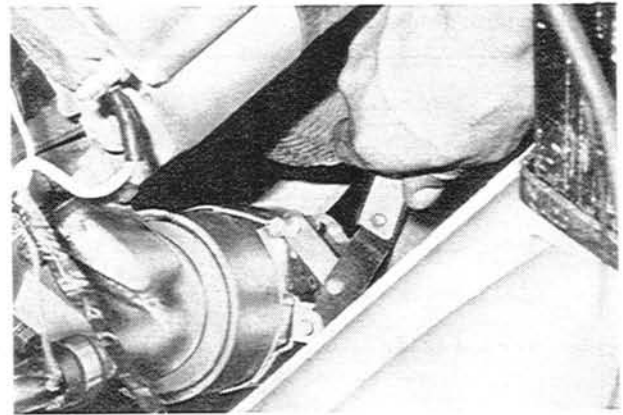


Fig. 2-10 Replacing of oil filter

2. Apply oil onto the oil seal on a new filter cartridge.
3. Install the cartridge onto the cover and screw in until it just touches the cover.
4. Tighten the cartridge a further **2/3 of a turn but absolutely no more.**
5. Start the engine and check that the joints are not leaking. Top up with oil if necessary.

SPECIAL TOOL

49 0187 280

Oil pressure gauge